IQARIS: A Tool for the Intelligent Querying, Analysis, and Retrieval from Information Systems

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Briefing Outline

- Background and Purpose of the Effort
- Features of the IQARIS
- Summary and Recommendations

Background and Purpose of the Effort

Background

- Information Glut, Measured In Terms of the #'s and Sizes of Documents, Has Been Increasing at a Dramatic Pace

- As More and More Information Resources Go "Digital", Tools are Needed to Enable Users to Quickly and Intelligently Find the Documents Relevant to Their Needs

Background and Purpose of the Effort

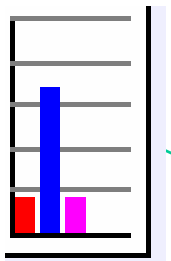
Purpose of the Effort

- The IQARIS Project is Designed to Provide a Modular Tool Suite to:
  - Intelligently Query a Range of Multi-Media Resources,
  - Visualize the Information Resource Content and Context
  - Provide a Bridge, when Appropriate, to Modeling and Simulation Resources

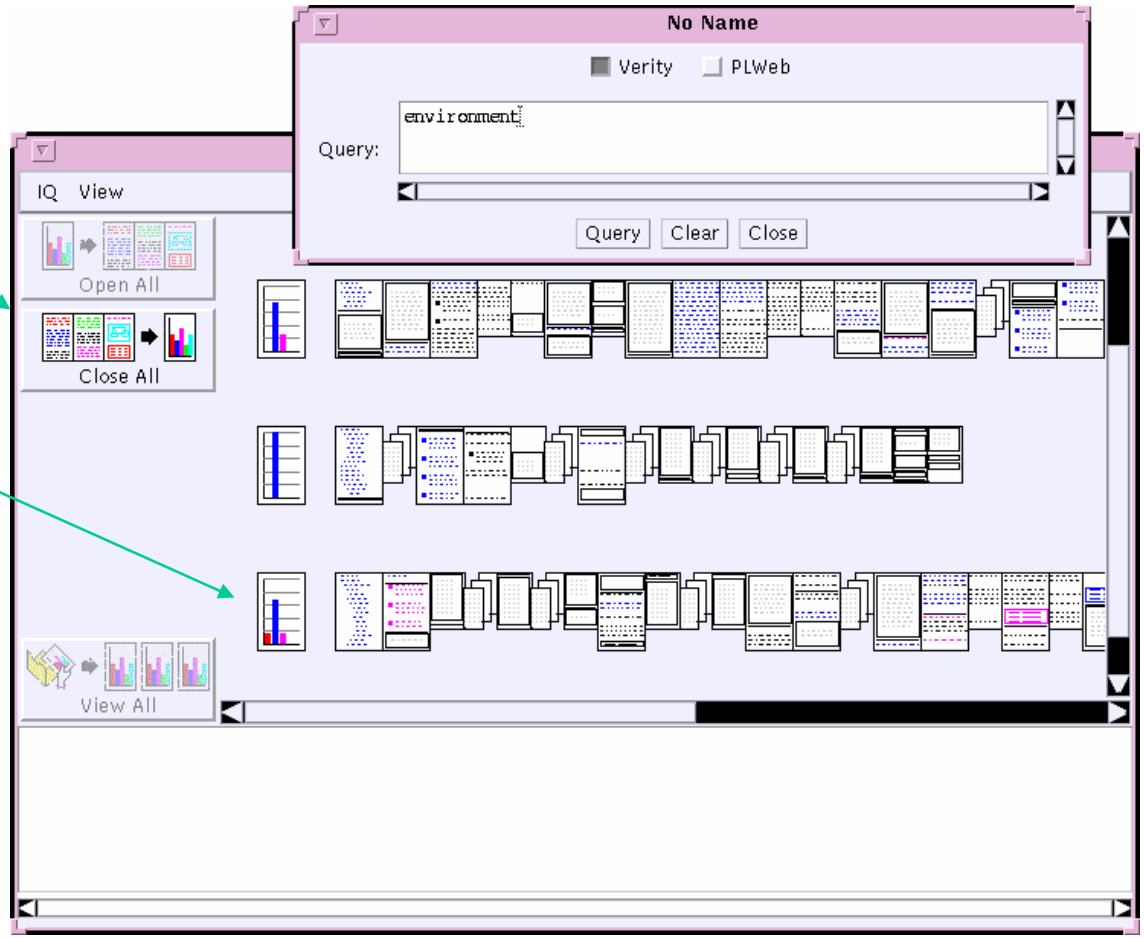
- IQARIS will Extend the Vision of a Previous System, IQ, that was Developed to Work with Digital Libraries

The IQ System Provided Value - Added Tools to Visualizing the Information Content

Buttons to Open and Close the Documents



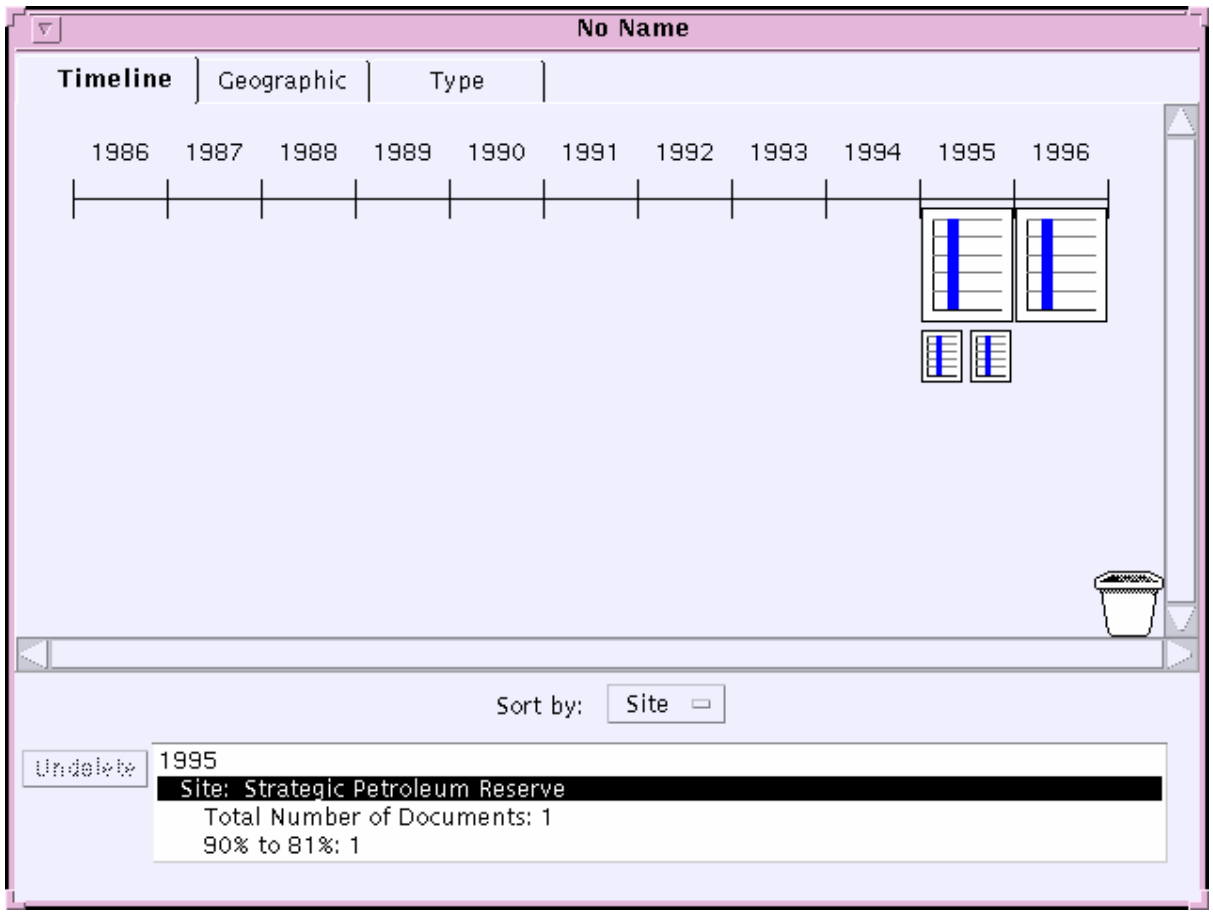
Bar Charts Showing the Number of Query Hits in Five Color Coded Proprietary “Relevance” Categories



Query “Hits” Highlighted in Color to Match the Relevance Categories

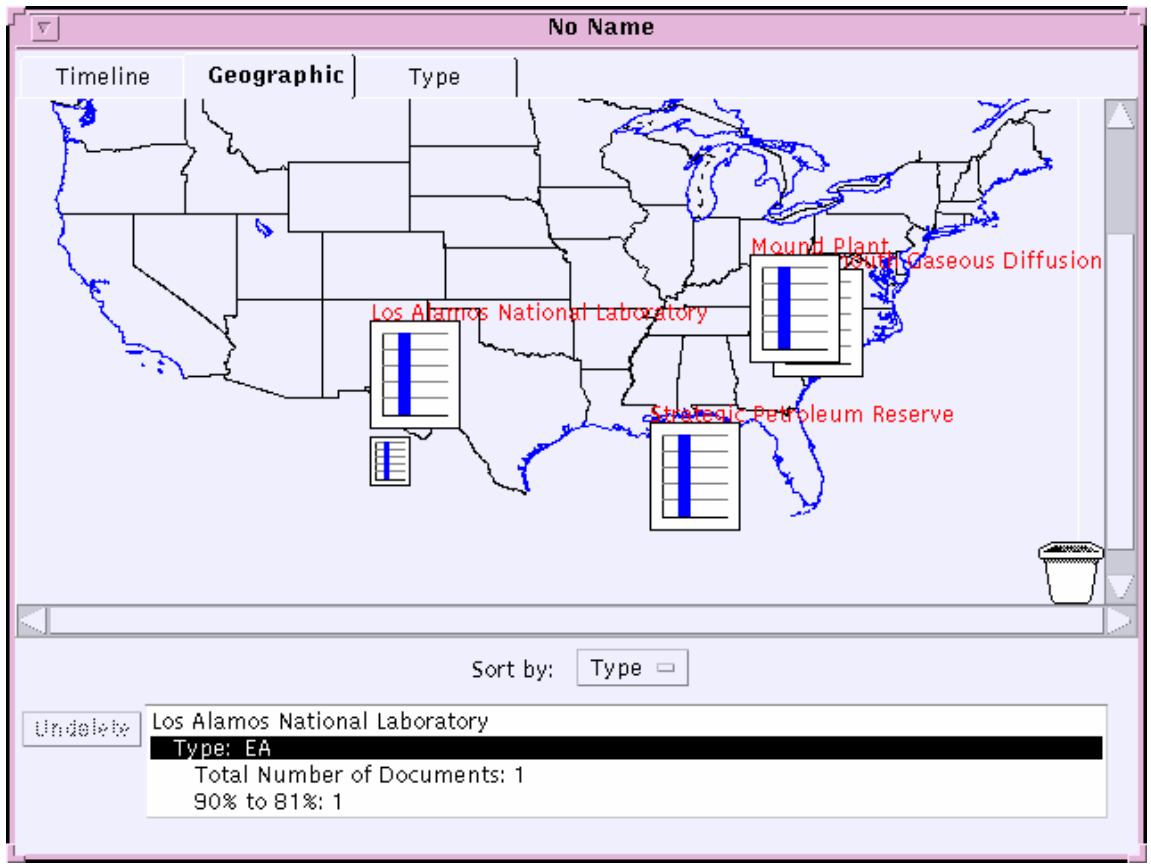
IQ Visualization: “Timeline” View

The “Timeline” View Related Documents by the Publication Date



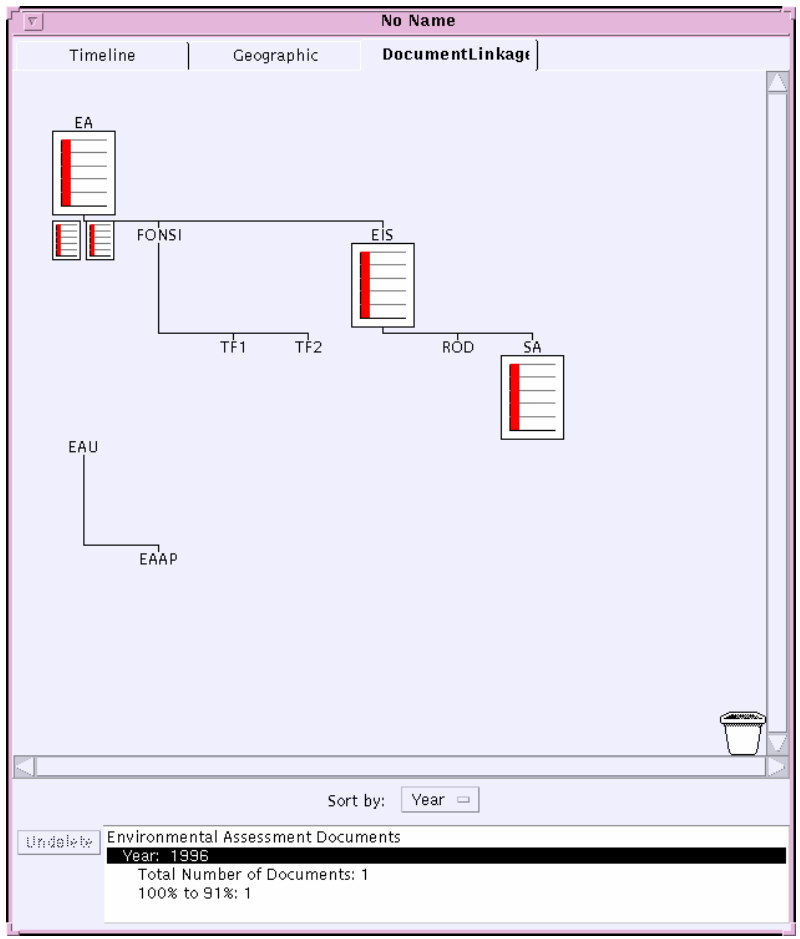
IQ Visualization: “Geographic” View

“Geographic” View Related Documents by the Location Referenced by the Document or the Location Producing the Document



IQ Visualization: “Type” View

“Type” View Related Documents by Showing the Linkages Between Documents of Different Types



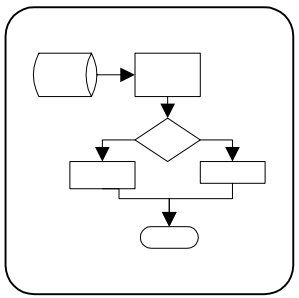
Extending the IQ Vision: Features of IQARIS

IQARIS Will:

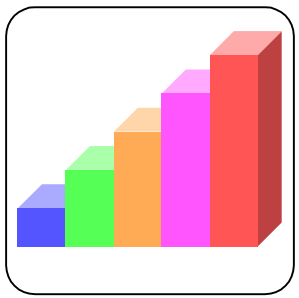
- Address a Full Range of Information Resources (e.g., Documents, Data, Images, Models, etc.)
- Employ Metadata Protocols to Describe the Content and *Context* of the Information Resources
- Involve Value-Added, Graphical Tools to Augment Conventional Search Engine Technologies
- Utilize Object-Oriented Concepts to Describe and Enable Manipulation of the Resources

Features of IQARIS: Addressing a Wide Range of Resources

An Iconographic Approach will be Used to Describe the Types of Resources

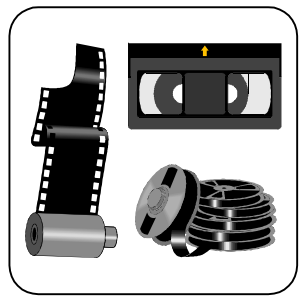


Program/Model

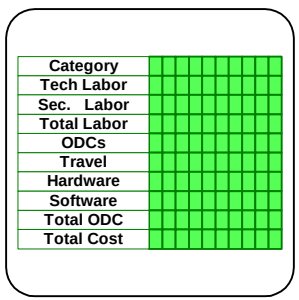


Data

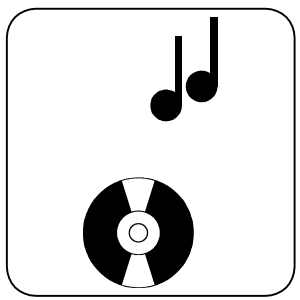
Document



Image



Application



Audio

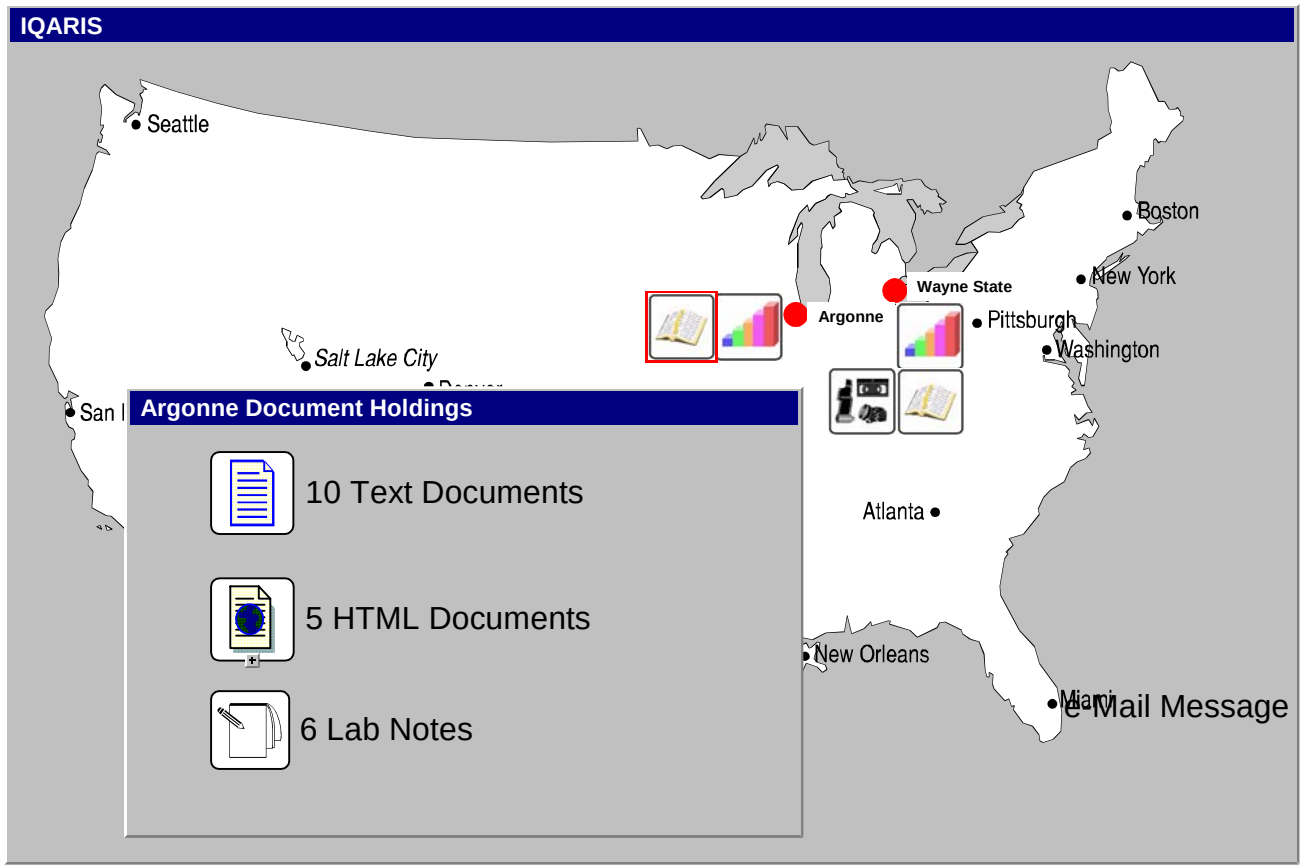
Extending the IQ Vision: Metadata to Describe the Content and Context

- Metadata Elements Based on the Dublin Core Protocols will be Used to Describe the Information Resources in Terms of Factors like:
  - *Who* Created, Manages, and Distributes the Resource
  - *What* it is is About
  - *Where* it is Located and Refers to
  - *When* it was Created, Made Available for Use, and the Time Periods it Relates to

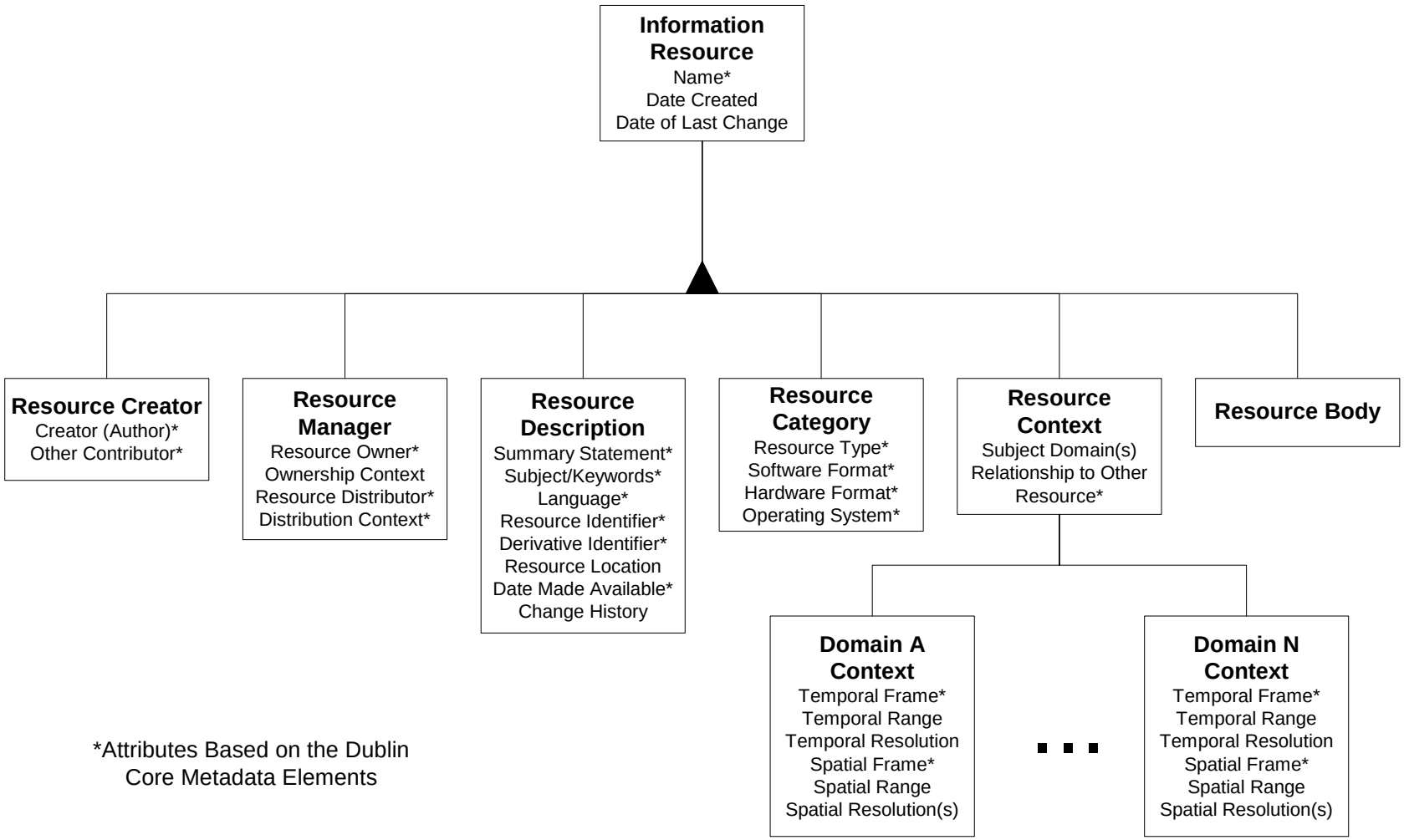
- The Basic Dublin Core Elements will be Augmented to Provide Other Key Contextual Details (i.e., What can You do With it)

Features of IQARIS: Additional Value-Added Graphical Tools

Will Enable the User to Drill Down Into the Resource Collections to Find Out What is There and Where they are Located

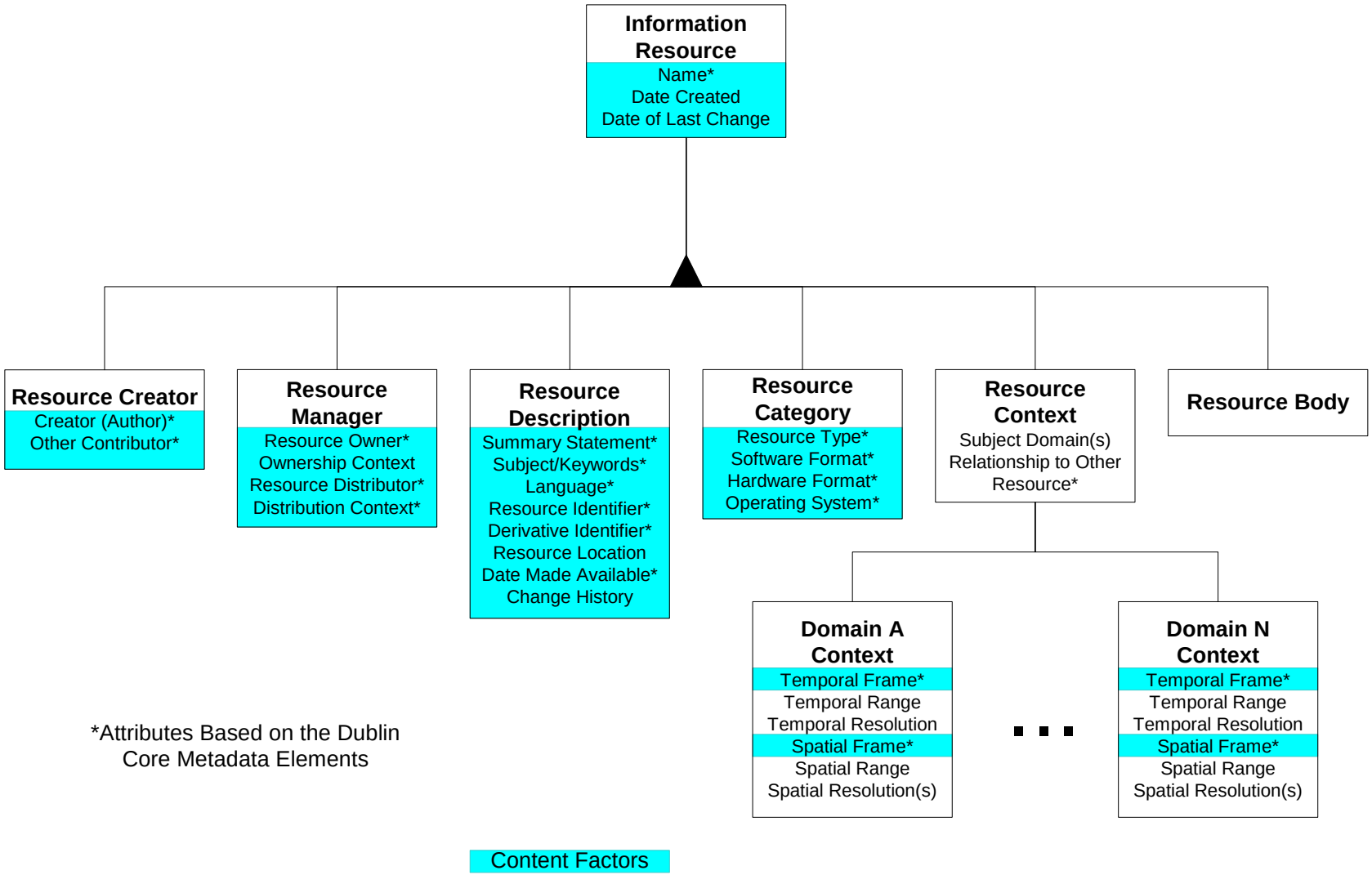


Features of IQARIS: Use of Object-Oriented Concepts



*Attributes Based on the Dublin Core Metadata Elements

Features of IQARIS: Use of Object-Oriented Concepts



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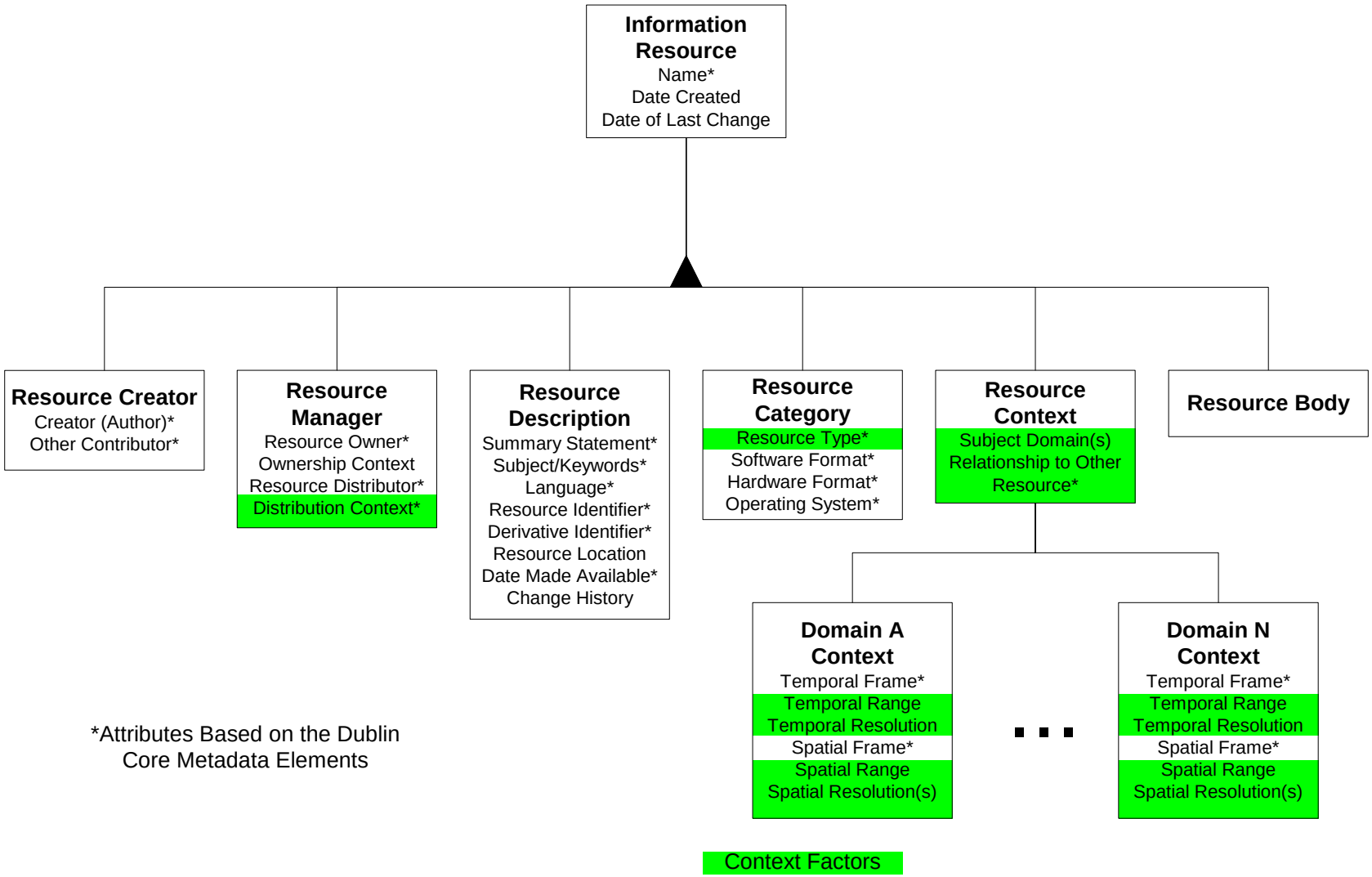


*Attributes Based on the Dublin Core Metadata Elements

Features of IQARIS: Use of Object-Oriented Concepts

- Information Resources, Like Objects in an O-O Application Exhibit *Behaviors* that can be Exploited:
  - Documents can be *Read*
  - Images can be Viewed
  - Data can be *Analyzed*
  - Models can be *Integrated*
- Argonne Has Developed a Flexible O-O Simulation Framework, the Dynamic Information Architecture System (DIAS), that can be Used with Information Resources as well as Modeling and Simulation Applications

Features of IQARIS: Use of Object-Oriented Concepts can Provide a Bridge to the M&S World

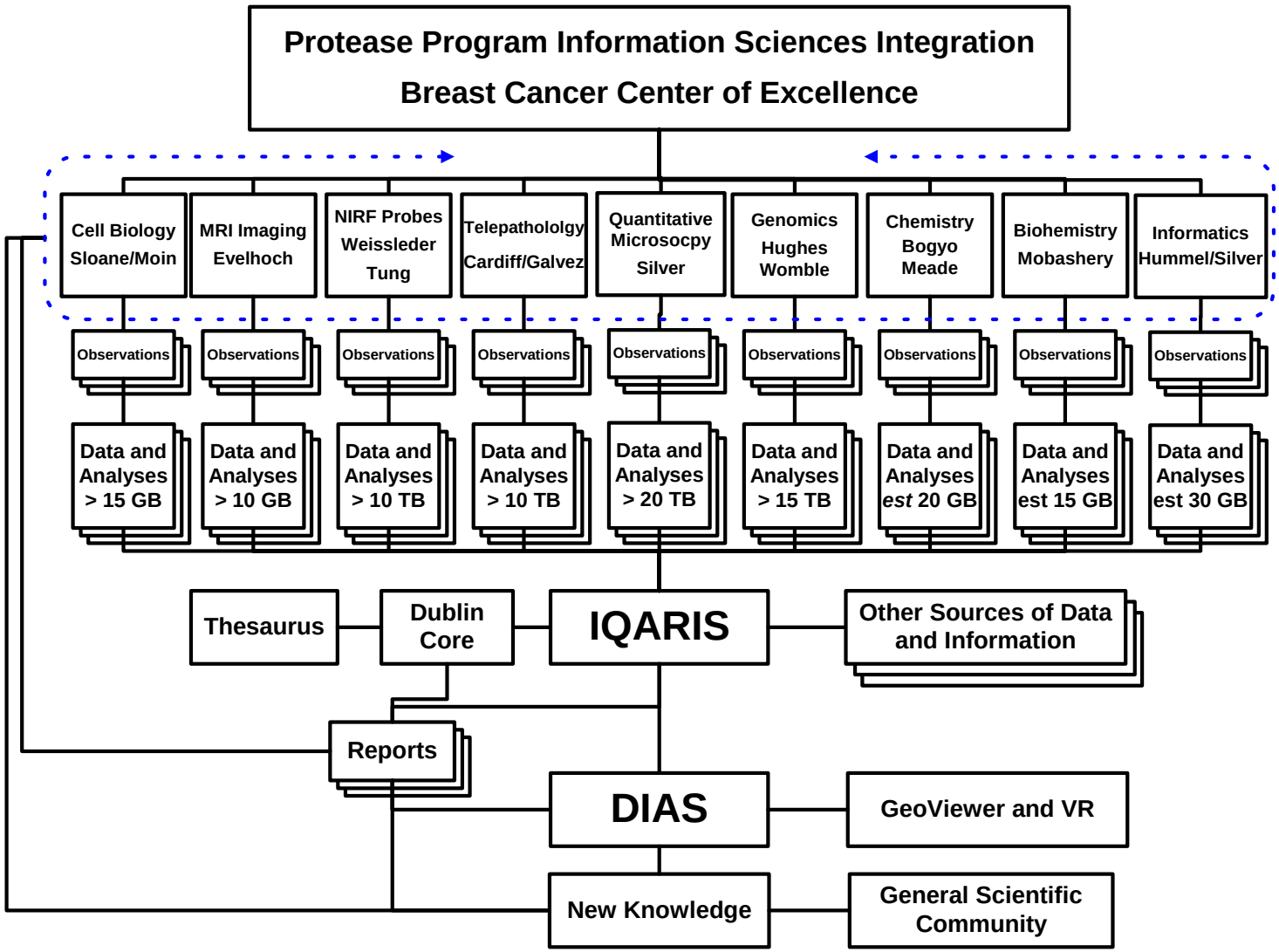
- DIAS Technologies will be Used to Augment the IQARIS Technologies and will also Provide a Bridge to the Modeling and Simulation Domain that Some of the Intended IQARIS Resources can Address

- IQARIS is Planned to be Used in a New Program to Develop a Breast Cancer Center of Excellence that will be Developed at the Wayne State University School of Medicine

Features of IQARIS: Use of Object-Oriented Concepts can Provide a Bridge to the M&S World

- Breast Cancer Center of Excellence Program
- Problem: 1 in 8 Women will be Diagnosed with Breast Cancer
  - Early detection saves lives
  - Many tumors are missed in “early” stages
- Challenge: Detect and destroy tumors by activity not “shadows”
  - Traditional methods are slow (Detection to treatment is weeks)
  - Small soft tissue tumors are difficult to detect with mammograms
  - Likelihood of spread of tumor increases with time
  - Data volumes are vast, in many formats and from distributed origins
- Key idea: Image Characteristic Tumor Enzyme Activities
  - Image tumor activities with MRI, PET and new Intra-vital Microscope
  - Inhibit specific enzyme activites to stop tumor growth
  - Develop communications and informatics algorithms to facilitate communications among distributed multi-disciplinary team

Features of IQARIS: Use of Object-Oriented Concepts can Provide a Bridge to the M&S World



Summary

- The Emergence of the Internet as the Medium for Digital Information Distribution is Resulting in a Glut that is Turning the Problem of Locating Appropriate Resources into one of Locating Needles in a Haystack

- Argonne Has Developed:
  - Information Management Technologies that can Augment COTS Search Engine Technologies to Enable the Information Context to be Easier to Assess
  - Simulation Framework Technologies that can be Used in the Information Domain as Well

Summary (Cont.)

- The Information and Simulation Framework Technologies will be Combined to Create a System, IQARIS, that will Provide:
  - User-Oriented Tools to Locate Information Resources, Analyze their Content, and Work with Them in a Context-Driven Manner
  - A Bridge to the Modeling and Simulation Domain